**Technical Memorandum**

**Subject:** **Comments on Rosemont Copper Project Habitat Mitigation and Monitoring Plan Permit No. SPL-2008-00816-MB**

**To:** **Marjorie Blaine, U.S. Army Corps of Engineers, Los Angeles District**

**From:** **Robert Leidy, U.S. EPA, Region 9**

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**Date:** **April 9, 2014**

The following are EPA's comments on the *Rosemont Copper Project Habitat Mitigation and Monitoring Plan Permit NO. SPL-2008-00816-MB* (HMMP), dated April 1, 2014.

In summary, the proposed mitigation: 1) does not offset mine impacts to aquatic resources in the Cienega Creek watershed; 2) is designed with high risk and uncertainty; 3) is out-of-kind; 4) is not self-sustaining; and 5) has questionable ecological benefits.

In addition, the HMMP fails to comply with several of the requirements of the 2008 Mitigation Rule (*e.g.*, Maintenance Plan, Performance Standards, Monitoring Requirements, Long-term Management Plan, Adaptive Management Plan and Financial Assurances).

## General Comments

- **Sonoita Creek Ranch (SCR) is not in the same watershed as the mine impacts and consequently does not offset any of the pervasive damage to aquatic resources in the Cienega Creek watershed.**

  SCR lies outside the watershed where the Rosemont Mine (RM) project impacts will occur and therefore, mitigation proposed at the ranch will not offset any direct or indirect impacts to aquatic resources within the Cienega Creek watershed.[1] This is a serious flaw in the site selection and the design of the mitigation as SCR is arguably the focal point or centerpiece of RMs proposals for offsetting mine impacts. The Cienega Creek watershed supports one of the most exceptional and unimpaired aquatic ecosystems remaining in the American Southwest; as a result of the project, and regardless of the mitigation proposed at SCR, the Cienega Creek watershed will experience significant loss of jurisdictional waters and degradation from unmitigated impacts to its aquatic environment.

[1] According to the Arizona Department of Water Resources (ADWR) SCR is within the Cienega Creek Groundwater Basin, but all groundwater flows originating on SCR move away from the Cienega Creek watershed following the stream gradient of Sonoita Creek toward Patagonia (Arizona Water Atlas, Section 3, ADWR 2010).

- **The proposed mitigation at SCR is out-of-kind.**

  Directly filled streams at the mine impact site are primarily 1st and 2nd order (*i.e.*, Strahler), with some 3rd order drainages. These jurisdictional waters form a complex network of 154 individual ephemeral and intermittent drainages that encompass 18 linear stream miles[2]. The stream network on the site functions as an important headwater source and mountain-front recharge area directly linked through the surface and subsurface pathways of the numerous streams to nearby downstream waters. The ecological significance of this setting is best viewed from a landscape-scale, hydrologic unit perspective. As such, the sites water yielding drainages and groundwater aquifers distribute water through surface and subsurface pathways to support the functioning of down-gradient streams, riparian forests, springs, seeps, and wetlands. The persistence and health of aquatic resources associated with Cienega Creek and its major tributaries of Barrel Canyon, Davidson Canyon, Empire Gulch, and Gardner Canyon are dependent on contributions of water from the impact site.

  Sonoita Creek is a 5th order ephemeral stream that functions very differently than the streams to be filled at the RM mine site (Note: there are several short reaches of 2nd through 4th order ephemeral tributaries that join Sonoita Creek on SCR). The length of constructed mitigation channels proposed at SCR represent a small fraction of the total stream length at the impact site. As a relatively low order, alluvial stream with a broad floodplain, Sonoita Creek receives flows many smaller tributaries in the upper watershed that are more similar to the streams to be impacted at the RM site.

  The HMMP states that streams at the mine impact site *…do not represent rare or regionally significant habitat types* (Section 6.4 Type Conversion, p. 40). Again, this statement demonstrates RMs complete misunderstanding of the importance of the watershed setting at the impact site in determining the functional significance of ephemeral streams (refer to discussion, above). The HMMP further mischaracterizes the streams at the mine impact site as not providing important riparian and wildlife movement corridors. It is well documented that the proposed mine will sever a critical wildlife migration corridor in the San Rita Mountains, effectively isolating over 13,000 acres of high functioning wildlife habitat, including additional drainages (Pima County 2014).[3]

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[2] Note: On the mine site there are over 100 acres of jurisdictional waters, mostly comprised of ephemeral streams. In addition, there are many additional miles of headwater stream channels on the site that have surface hydrological connects to the directly impacted streams.

[3] Memorandum Re: Visual Understanding of the Adverse Impact of the Rosemont Mining Proposal, from Chuck Huckelberry, County Administrator, Pima County, to The Honorable Chair and Members of the Pima County Board of Supervisors dated January 17, 2014.

**Constructed Channels at SCR**

- **There remains high risk and uncertainty associated with the proposed channel construction.**

  The proposed constructed channel mitigation is permittee responsible. RM claims that the proposed channel design does not include construction of any weirs, diversion structures or levees, and is designed to be self-sustaining and therefore, no maintenance is expected. However, we continue to believe that the project will require significant and risky hydrologic modifications (*i.e.*, construction of multiple high-flow bypass and secondary channels), structures requiring long-term maintenance (*i.e.*, channel bank stabilization, levees to protect ponds, potential gas pipeline relocation and repair), planned vegetation maintenance (*i.e.*, land clearing), and shallow structures (*i.e.*, riprap at channel bends, buried geotextile fabric). While pilot channels are designed to allow migration within the larger constructed channels, the proposed constructed channels are designed to remain in place, as static channels, and as such will not be allowed to migrate naturally across the floodplain. This means that there is increased risk that flood damage from likely channel migration will require regular repairs and other maintenance activities that will reduce the functional value of the mitigation. There are few, if any, examples of fixed channels constructed within alluvial floodplains that do not require regular human intervention and maintenance. Many such constructed channels completely fail or do not function as intended.

  The SPD Mitigation Ratio Training Presentation (Attachment 2, Instructions (step 7)) states the following, *"Note: if too many uncertainty factors are identified, this may indicate the overall mitigation proposal/design is not acceptable."*

- **There is insufficient information to predict with reasonable certainty the current and future behaviors of Sonoita Creek and the proposed constructed channels.**

  Water and Earth Technologies (WET: *Conceptual Design for Ephemeral Channel Adjacent to Sonoita Creek*, March 28, 2014) characterizes Sonoita Creek at SCR variously as follows: *In the channelized reach, confinement of flood flows to a straightened and incised channel maximizes flow velocity, exacerbates incision with additional scour and degradation, and lowers the water surface elevation of in-channel flow and associated infiltration adjacent to the channel.* (p.1). WET (2014) further states: *The capacity of the resulting* [Sonoita Creek] *channel is highly variable, depending upon the degree to which the channel has been incised or bermed.* (p. 11). At the April 2, 2014 SCR field visit WET stated that Sonoita Creek at the existing secondary channel braid at the point of the proposed surface flow diversion was neither showing indications of channel aggradation or incision; the channel appeared stable. In contrast, WET stated that Sonoita Creek on South Sonoita Creek Ranch was unravelling or falling apart; the channel was unstable. Clearly, there is insufficient analysis to determine with reasonable certainty whether the current balance between sediment transport capacity and load. Successful channel restoration design requires a clear understanding of sediment supply and other processes,

not simply copying channel form alone (Kondolf 1998[4]).There has been insufficient quantitative information collected over sufficient time periods on channel process such as flow hydraulics, sediment transport and bank stability to understand the current state of active channel processes on Sonoita Creek. Acceptance of the proposed channel designs as mitigation in the absence of such quantitative information significantly increases risk and the likelihood that this proposed mitigation will fail or not function as proposed. (Simon *et al.* 2007[5]).

- **There is no historical evidence that Sonoita Creek at SCR or South SCR supported braided floodplain systems similar to the proposed channel design. Nor is there an appropriate template to compare cross-sectional geometry calculated for SCR.**

  There are no natural reference sites comparable to the HMMPs proposed channel design at SCR. WETs use of Big Casa Blanca Canyon (BCBC) for comparative purposes is flawed because BCBC is disturbed, confined and unbraided. The HMMP proposes a complex spatial configuration and relatively high density of constructed channels at SCR, and this design may not have any historical precedent or be representative of pre-disturbance, natural channel configurations in the watershed, or elsewhere in the arid Southwest. The proposed design appears to be an attempt to maximize channel length and density with little consideration of historical or future conditions. It is highly likely that historically Sonoita Creek at SCR was always a single thread channel that migrated across the floodplain. The current alignment of Sonoita Creek at SCR has not changed since at least the 1940s. Based on existing information and analysis WETs contention that SCR historically supported a braided channel configuration and that the proposed mitigation channel design is appropriate is speculative.

  Furthermore, we question the number and density of constructed channels proposed for the SCR/South SCR floodplain. We tallied 17 constructed channel junctions/confluences, and many other outside meander bends, as configured and depicted on the figures submitted in the HMMP. This is troubling given that these channel features will be constructed in an alluvial system. The risk is significant that one or more of these areas of flow bifurcation or concentration could fail resulting in channel migration or breakout into the floodplain. To prevent lateral migration, these features will require armoring, regular monitoring, maintenance, and remediation long into the future.

- **The proposed constructed channels are not fully designed as self-sustaining, unconstrained, or naturally functioning floodplain channels and so they will not provide significant and lasting ecological benefits to the aquatic ecosystem. There is a substantial risk that they may fail to function as designed.**

  RM notes that the existing Sonoita Creek channel is prevented from adopting the ephemeral channel morphology typical of laterally unconstrained stream reaches. During the April 2,

[4] Kondolf, G. M., 1998. Lessons learned from river restoration projects in California. Aquatic Conservation: Marine and Freshwater Ecosystems 8: 39-52.

[5] Simon, A., Doyle, M., Kondolf, M., Shields, F.D., Rhoads, B. and M. McPhillips. 2007. Critical evaluation of how the Rosgen classification and associated "natural channel design" methods fail to integrate and quantify processes and channel response. Journal of the American Water Resources Association. 43(5): 1117-1131.

2014 field visit to SCR, RM and their consultant (Water and Earth Technologies) stated that a goal of the proposed mitigation plan is to create a natural, stable, floodplain system at SCR. If the proposed constructed channels are expected to be self-sustaining and inherently stable, then why will buried rip-rap be required for channel banks at meander bends? Lateral and vertical channel migration will only be allowed to occur ***within*** pilot channels within larger constructed channels. In other words, natural fluvial processes will necessarily be constrained to the relatively narrow cross section of the constructed channel. It is our understanding that proposed hardened bank protection is necessary to prevent the natural dynamic of migrating meander bends in order to protect an existing pipeline and also prevent channel braids from reaching and rejoining the mainstem of Sonoita Creek. Preventing the natural lateral movement of the larger constructed channels on the Sonoita Creek floodplain can hardly be considered characteristic of a natural floodplain system. As proposed, preventing natural lateral migration of the alluvial channels will be difficult and likely require regular monitoring, maintenance and repair in perpetuity. In fact, the Rosgen C type channel design proposed at SCR is a channel form that would have a tendency to naturally migrate; however, the larger constructed channels will not be allowed to migrate freely across the floodplain. As such, the proposed constructed channels will function more as an artificial flood conveyance system than a natural, passive floodplain ecosystem.

The prevention of lateral channel migration will greatly reduce the numerous ecological benefits of an unconstrained migrating channel (Kondolf and Railsback 2001[6]). High-functioning, natural floodplain channels are characterized by unrestricted lateral movement in response to high flows, thereby maximizing floodplain functions and the diversity and amount of valuable self-sustaining aquatic and riparian habitats. Constraining the movement of the proposed constructed channels will limit their ecological benefits to the aquatic environment and functional value as mitigation for the project's loss of aquatic habitats. The constructed channel may also require frequent maintenance and, therefore may not be considered self-sustaining or passive mitigation. Constraining the channel may result in scour and incision with the loss of function, not unlike what historically occurred on Sonoita Creek. These are secondary, unforeseen problems that have not been contemplated or considered in contingency planning in the HMMP. What mitigation is proposed by RM if the constructed channels at SCR fail to function as planned?

- **The hydrologic models appear to over-estimate peak flows in Sonoita Creek. Even a seemingly small overestimation of the frequency and volume of peak flows would significantly increase the risk that the constructed channels and floodplain will not function as designed.**

  Modeled predictions of the frequency of storm flows entering the constructed channel may be exaggerated putting the ecological benefits of the proposed constructed channel in question. Peak storm flows were estimated through the use of standard hydrologic analyses and modeling. Flows of greater than 1,500 cfs in Sonoita Creek are predicted to spill over-bank and enter the secondary channel and hence the constructed channels between the 2-

[6] Kondolf, G.M., Smeltzer, M.W., and S. Railsback. 2001. Design and performance of a channel reconstruction project in a coastal California gravel-bed stream. Environmental Management 28(6): 761-776.

year, 24-hour and 5-year, 24-hour storm events. However, analysis of readily available aerial photography indicates that the existing secondary channel has not carried overflow from Sonoita Creek since the early-to-mid 1990s, an interval approaching 20 years, suggesting that modeled predictions do not accurately reflect current rainfall and stream discharge patterns within the Sonoita Creek watershed. In addition, during our April 2, 2014 field visit to SCR we observed no physical evidence that the existing natural secondary channel at the proposed diversion point from mainstem Sonoita Creek has recently carried surface flows. Indeed, the channel supported mature populations of upland plant species within the channel and there was no physical evidence of recent surface flows, scour or deposition. Clearly, the physical evidence indicated that the secondary channel had not carried surface flows from Sonoita Creek for some significant length of time. In addition, natural drought and predictions that climate change will further diminish surface flows in this region have not been factored into modeled projections of the frequency and amount of future peak flows. Climatic shifts may cause the channel system to shift to a new mode of behavior (Graf 1981[7]). If modeled flows do not materialize as predicted, then the plan to restore the SCR floodplain will certainly fail.

It is critical to understand, that surface flow patterns at SCR are in contrast to the directly impacted drainages at the RM mine site that typically carry flows and provide important hydrologic, physical and ecological functions annually during the monsoon season. As designed, it is questionable whether the proposed constructed channel at Sonoita Creek Ranch will flow at a frequency and duration sufficient to offset many of the stream functions directly and indirectly lost at the proposed mine site.

- **Long-term modification/maintenance of the existing natural secondary channel will likely be required in order to assure that adequate peak surface flows reach the constructed channels.**

  Sediment deposition and other hydrologic changes at the confluences of Sonoita Creek and the secondary diversion channel will likely require regular maintenance/modification to allow sufficient flows during projected 2-to-5-year peak storm events to reach the constructed channels. Failure of the secondary channel to convey sufficient surface flows into the constructed channels will jeopardize the proper functioning of the floodplain channels. In addition, there is only a single channel proposed to divert flows from Sonoita Creek into the main constructed floodplain channels. This increases ecological risk, because failure of the natural secondary to convey adequate flows threatens the successful functioning of all of the proposed constructed channels.

- **The stated ecological benefits of constructing multiple primary and secondary channels within the floodplain of South SCR are questionable.**

  During our April 2, 2014 field meeting, WET confirmed that much of the South Sonoita Creek Ranch floodplain is already hydrologically connected to Sonoita Creek during floods. In addition, we observed that the existing floodplain supports high densities of big

[7] Graf, W.L., 1981. Channel instability in a braided sand bed river. Faculty Publications. Department of Geography, University of South Carolina, Paper Number 1W0584: 1087-1094.

Sacaton (*Sporobolus wrightii*), an indication of a moderate-to-high functioning floodplain. Big Sacaton is valuable for wildlife and on floodplains reduces erosion, traps sediments, and slows runoff that increases infiltration (Tiller et al. 2012[8]). Finally, after Smith Canyon flows under Hwy 82 surface flows quickly spread out and infiltrate into the Sonoita Creek floodplain; thus serving an important groundwater recharge function. The HMMP (WES) proposes to construct a channel from where Smith Canyon crosses under Hwy 82 to connect Smith Canyon to a newly constructed Sonoita Creek channel. Based on our review of this proposal and considering on-site observations, we seriously question the ecological benefit or functional lift of constructing multiple channels within the Sonoita Creek floodplain on South Sonoita Creek Ranch. We believe that a quantitative functional assessment would demonstrate that the ecological lift of the proposed channel construction would be minimal at best. The constructed channels may actually result decreases in the level of some functions and have unintended, negative consequences on the big Sacaton grassland. Furthermore, it appears that the proposed construction of new channels on South Sonoita Creek Ranch and SCR may represent more of an effort to maximize mitigation acreage and credit for the establishment of new channels (waters), rather than a plan to improve overall floodplain functions.

- **RM significantly overestimates the total area of waters of the United States for all of the proposed constructed channels.**

  To calculate the acreage of WOUS, RM uses the 10-year, 24-hour design discharge. This significantly overestimates the reach and extent of waters of the U.S. below the Ordinary High Water Mark (OHWM). This is troubling because RM has consistently overestimated the extent of waters in previous drafts of their mitigation plan. The OHWM should be based on physical evidence. In the absence of such evidence the 2-5 year return flow should be used to estimate the OHWM. The 2-5 year return flow better reflects the location of the OHWM for most similarly-sized ephemeral streams in the arid Southwest.

- **RM is seeking reestablishment credit for 344.7 acres of riparian floodplain buffer. Credit for this amount of riparian buffer is excessive as it is seeking reestablishment credit for virtually the entire SCR and South SCR floodplain.**

  The HMMP identifies the total lengths of constructed channels on SCR and South SCR as 12,464 feet and 4,780 feet, respectively; for a total constructed channel length of 17,244 linear feet. A 50-foot riparian buffer along both sides of the constructed channels would total 39.6 acres of riparian buffer habitat. A 50-foot buffer width is ecologically justified given that the channel gradient through the project site is about 1% and preservation of the remainder of the floodplain outside the 50-foot buffers will adequately protect the constructed channels.

[8] Tiller, R., Hughes, M. and G. Bodner. 2012. Sacaton Riparian Grasslands: Mapping Distribution and Ecological Condition using State-and-Transition Models in the Upper Cienega Creek Watershed. The Nature Conservancy, Tucson, AZ. 45 pp + appendices.

- **There is no evidence that there will be sufficient overflow from Pond 2 to provide and sustain aquatic and riparian habitat along the 2,400 feet of the Constructed Overflow Channel.**

  Sonoita Creek Ranch floodplain alluvium is typically classified as Pima or Grabe-Comoro complex soils that consist primarily of sandy or silty loam which are well-drained, and do not pond water. As such, surface water percolates rapidly into the soil. Because soils at SCR are very well drained, RM has proposed placing a synthetic liner under the Overflow Channel to artificially perch the water table. This liner will only function to perch water for a limited amount of time as the liner will eventually deteriorate and water will once again sink into the porous soils. Again, the use of such artificial liners is not a natural or sustainable mitigation measure. At the April 2, 2014 field meeting RM acknowledged that they were unable to determine the amount of riparian vegetation that will be supported within the Overflow Channel. Nevertheless, RM is seeking mitigation credit for the establishment of waters within the Overflow Channel.

- **RM should not receive *enhancement* credit for the 27.4 acres of existing waters. Rather, this proposed mitigation should be assessed as preservation. RM's proposed enhancement of existing waters does not comply with the 2008 Mitigation Rule.**

  RM proposes the enhancement of 27.4 acres of waters on Sonoita Creek Ranch through the construction of a wildlife-friendly fence and the exclusion of livestock grazing at the beginning of the mitigation effort (p.35). Without any quantification of the functional lift associated with fencing, the enhancement of waters cannot be measured and therefore, cannot be considered as mitigation credit. Based on visual observations during our April 2, 2014 field visit, the existing waters do not appear to be significantly degraded. Therefore, only preservation credit should be considered for these waters.

  RM proposes to meet their designed performance criteria once the fences are constructed. Contrary to the 2008 Mitigation Rule, there are no performance criteria to determine any enhancement of waters following fence construction (p. 58).

- **RM should not receive *enhancement* credit for 95.2 acres upland xeroriparian buffer habitat. Rather, this proposed mitigation should be assessed as preservation. In addition, this acreage should be weighed against the xeroriparian habitat impacted at the mine site.**

  RM proposes the enhancement of 95.2 acres of xeroriparian buffer habitat on SCR through the construction of a wildlife-friendly fence and exclusion of livestock grazing at the beginning of the mitigation effort (p.35). There is no information in the document on buffer width calculations. Without any quantification of the functional lift associated with fencing, the enhancement of xeroriparian buffer habitat cannot be measured and therefore, cannot be considered as mitigation credit. Based on visual observations during our April 2, 2014 field visit and previous site visits, the existing xeroriparian buffer habitat does not

appear to be significantly degraded. Only preservation credit should be considered for this habitat.

In addition, no consideration has been given for the 1,252 acres of xeroriparian buffer habitat that will be impacted by the proposed mine. Not including the impacts to xeroriparian at the mine site in the context of the proposed mitigation allows for an inequitable or unbalanced application of mitigation credits.

RM proposes to meet their designed performance criteria once the fences are constructed. There are no performance criteria to determine any enhancement of xeroriparian habitat buffer following fence construction (p. 58). Therefore, the proposal for xeroriparian buffer habitat enhancement credit is contrary to the 2008 Mitigation Rule.

- **Performance standards for the grading and construction of channels and other features on SCR are unrealistic and therefore deficient.**

  According to the HMMP, performance standards for the SCR grading and construction components for the reestablished riparian floodplain channels will have effectively met their designed performance criteria upon completion of construction. In addition, the channels will be monitored to ensure they are stable by the completion of the 10-year monitoring period. This performance standard is inadequate because it is likely that the constructed channels will not have received flows of sufficient frequency and duration during the first 10 years following their construction to assess whether the channels are stable. In addition, the performance standard does not discuss what stability measures or techniques will be used to document erosion and aggradation, nor have suitable success criteria been identified or developed. Therefore, this performance standard does not comply with §332.5 of the 2008 Mitigation Rule.

**Enhancement of Two Ponds**

- **No 404 mitigation credit should be given for the 6 acres of enhanced ponds. The HMMP provides no information demonstrating the ponds will be sustainable or will offset project impacts. The proposed mitigation does not comply with the 2008 Mitigation Rule.**

  The HMMP proposes to impact the existing ponds to create "a conglomeration of smaller water bodies" in order to provide more suitable habitat for the Chiricahua leopard frog (p. 44). There is no information regarding the type and acreage of wetland habitat proposed as mitigation, nor is there an assessment of the impacts to aquatic resources from modification of the existing ponds. There is no information presented on the current flow from Monkey Spring which is necessary to determine whether these ponds are sustainable.

  RM proposes to use a chemical sealant to "seal the ponds but still allow enough seepage to support the vegetation that currently surrounds the ponds." (p. 44). There is little information on the efficacy of the proposed chemical sealant, and there is no information to demonstrate that seepage can be controlled. An online search for information on ESS-1 notes concerns with its effective use on sandy or gravelly soils. There is only mention

of the chemical sealant ESS-13 in *Table 1 – Sonoita Creek Ranch Mitigation Site Capital Cost for re-establishing historic channel, pond renovation, riparian habitat restoration, and access control,* as well as in Appendix C -*Management and Monitoring Activities for Sonoita Creek Ranch* (p.3). These tables note the costs for the ESS-13 Ponder Liner, Noxious Weed Herbicide Treatment Application, as well as costs of long term management. In particular, it states that the ponds will need to be completely "renovated" every 50 years.

EPA maintains this proposed pond mitigation is a requirement of the USFWS Biological Opinion and should not be double-counted as 404 mitigation. Our position is supported in the Preamble of the 2008 Mitigation Rule: "Resources that are restored, established, enhanced or preserved to satisfy the requirements of other federal programs may not also be used for compensatory mitigation for DA permits." (p. 19608). The Preamble does note a consolidated project can be used to satisfy more than one set of requirements provided the same resource is not double-counted. In this case, the proposed ponds and adjoining wetlands would be used as frog habitat and therefore, should only address the requirements of the conservation measures pursuant to the Endangered Species Act.

The proposed performance standard does not comply with the 2008 Mitigation Rule (p. 57). The HMMP claims to automatically meet performance criteria once the ponds have been constructed and are capable of supporting Chiricahua leopard frog populations. The HMMP fails to provide performance standards for wetlands/waters for which RM is seeking mitigation credit.

**Monkey Spring**

- **RM proposes provision of water from Monkey Spring to support ponds, wetlands and other riparian vegetation at SCR for which they are seeking CWA 404 mitigation credit. To date, Rosemont has failed to demonstrate there is sufficient water from Monkey Spring to support any enhancement or establishment of wetlands/waters. Despite repeated requests by the Corps and EPA, Rosemont has refused to measure flow volume from Monkey Spring. Rosemont cannot receive mitigation credit in absence of confirmation of the amount of water currently available from Monkey Spring.**

  RM has acquired option rights on the SCR. Upon ownership, RM will have a 75% water allocation from Monkey Spring. Rosemont states this is equivalent to a flow volume of 590.77 AFA. EPA understands that the flow has not been measured from Monkey Spring since approximately 1973. It is highly uncertain whether Monkey Spring currently produces the full water allocation as described in the Certificate of Water Right from ADWR, and whether available water is sufficient to support wetlands at SCR. An affidavit by a previous owner, Raymond Rich, stated Monkey Spring flowed at 1100 gallons/ minute = 1,774 AFA in 1966. The current estimate indicates a drastic decline in the amount of available water since 1966. A certified water engineer must measure flow in order to ensure the amount of water available for mitigation purposes. Given natural drought, climate change, and potential future mining in the watershed, it is uncertain whether flows from

Monkey Spring are sustainable. There are anecdotal accounts of local wells drying in the area in response to drier climatic conditions.

- **Temporal loss of waters could be significant due to the long term and inherently risky ADWR approval process. Despite repeated requests by the Corps and EPA, Rosemont has not provided documentation from ADWR confirming the process for water use approval.**

  The Certificate of Water Right identifies the locations of the place of beneficial use of this water. A sever and transfer will be necessary if ADWR determines the proposed project places the water at a different location on the property. An approved sever and transfer by ADWR would first require approval of the irrigation district, agricultural improvement district, or water user's association. Sever and transfer processes may take several years, especially if any parties protest the action. A recent sever and transfer took 11 years, two others are pending at 9 and 12 years.

  The water rights are currently designated for irrigation and stock. Utilization of the water for ESA purposes in the ponds would likely constitute a change in beneficial use. Additionally, constructed channels through agricultural fields may not be considered irrigation and may also constitute a change in beneficial use. If so, a "Change In Beneficial Use" application would need to be filed with the ADWR.

- **HMMP, Section 6.1, Functions (pp. 32-36).**

  The qualitative functional comparison of functional loss associated with the mine impact site with the functional gain at the SCR mitigation site is scientifically flawed and unsupportable, and therefore, is not a valid method for comparing functional losses and gains at the impact and mitigation sites (See p. 36, Table 2. *Summary Comparison of Functional Loss at Rosemont Impacts Site versus Gain at Sonoita Creek Ranch*). The overwhelming assignment of low-to-moderate ratings of functional loss to the various functions of small, headwater and large low-gradient streams at the mine impact site demonstrates a complete misunderstanding of how headwater and large wash systems function in arid watershed settings, and dismisses the critical importance of this headwater stream network to the functioning of downstream waters in Davidson Canyon and Cienega Creek.

  Notably, Table 2 (p. 36), with the exception of the constructed floodplain channels, ranks the majority of the functional gains at the SCR for various mitigation elements (*e.g.*, established overflow channel, enhanced buffer, floodplain buffer) as no-to-low functional gain. This suggests that RM should receive very little, if any, mitigation credit as there would be little functional gain from implementing the proposed mitigation measures.

**Fullerton Ranch**

- **Fullerton Ranch is not in the same watershed as the mine impacts and consequently does not offset any of the pervasive damage to aquatic resources in the Cienega Creek watershed.**

  Fullerton Ranch lies far outside the watershed where the RM project impacts will occur and therefore, mitigation proposed at the ranch will not offset any direct or indirect impacts to aquatic resources within the Cienega Creek watershed. This is a serious flaw in the design of the mitigation. The Cienega Creek watershed supports one of the most exceptional and unimpaired aquatic ecosystems remaining in the American Southwest; as a result of the project it will experience significant unmitigated impacts to its aquatic environment.

- **There is no analysis regarding the functional condition of the Fullerton Ranch.**

  Without a quantitative baseline and post-mitigation functional assessment of the condition of the aquatic and upland resources on the ranch, it is not possible to determine the functional gain (enhancement) from removing grazing from the ranch. Based on a review of surrounding land use, there is no threat of destruction or additional adverse modification to aquatic resources beyond its current grazing use.

- **RM's proposal to remove five earthen dams from several drainages will actually impact existing aquatic functions and will result in little, if any, function lift to existing waters.**

  RM is seeking mitigation credit for the reestablishment of 2.4 acres of ephemeral channels by removal of five earthen dams. These existing earthen dams perform several important functions including surface water storage for wildlife and sediment storage. Removal of these dams will impact existing waters, result in the loss of existing aquatic functions, and may increase channel scour and sedimentation in downstream washes. There is little to no functional gain from removing these earthen dams and eliminating the stock ponds. Removing the ponds may actually result in a decrease in the reach and extent of existing waters. Therefore, RM should receive no reestablishment credit for removal of the dams.

- **RM should not receive rehabilitation credit for riparian buffers and existing waters for livestock fencing at Fullerton Ranch.**

  The HMMP states that RM will fence the entire parcel and exclude any livestock grazing resulting in the rehabilitation of 47.7 acres of ephemeral channels, 262.6 acres of riparian buffer habitat. The HMMP presents no quantitative analysis of current grazing practices and their relationship to the existing functional condition of aquatic resources on the mitigation sites for purposes of determining rehabilitation or enhancement credits. Overgrazed aquatic resources can benefit from cessation of grazing, but most benefits to the aquatic environment can be realized by removing grazing from the immediate stream and riparian zone. Any credit given to RM for the exclusion of grazing should be for enhancement or preservation only.

**Pantano Dam Parcel – water rights**

- **250 AFA of surface flows released at Pantano Dam will not result in rehabilitation of aquatic functions and therefore, is not acceptable as 404 mitigation.**

  Most of the released water would likely drain into the porous substrate and deep aquifer without providing functionally meaningful improvement in aquatic resource functions. Release of surface flows downstream at Pantano Dam does nothing to replace the ecological functions indirectly impacted along 18 stream miles at Barrel and Davidson Canyons. Mitigation should replace the suite of functions typically provided by the affected aquatic resource.

  In the HMMP, RM claims acquisition of surface water rights is recognized in the 2008 Mitigation Rule as a "critical step in ensuring the long-term sustainability of mitigation efforts…"(p. 10). EPA acknowledges this provision in the Rule, but notes the acquisition and protection of water rights may be needed to ensure the sustainability of a mitigation project. Water rights are not considered as a stand-alone mitigation measure (Preamble p. 19647).

- **Natural drought, climate change and mining will diminish flows**.

  The HMMP states RM will discharge an estimated 250 AFA into Cienega Creek downstream of the Dam as mitigation. Recent USGS measurements of base flow indicate that the total available wet water at the Pantano Dam is only an average 360 AFA. It is well known that dependable surface flows, as measured by USGS, continue to diminish due to a variety of factors, including natural drought and climate change.

  Recognizing the effects of drought and climate change, Rosemont performance standards in the HMMP do not include a commitment to provide 250 AFA in perpetuity (p. 63).

- **Establishment of an MUSF below Pantano Dam negates any beneficial groundwater recharge.**

  The water captured and discharged below the dam will be part of a managed underground storage facility (MUSF) that will be permitted through ADWR. An MUSF allows the permit holder to operate a facility that stores water in the aquifer which can be recovered for use. Eligible water stored for more than one year may qualify for long-term storage credits. A holder of long-term credits may recover the water by grant, gift, sale, lease or exchange all or part of the long-term storage credits.[9] Removal of water via the MUSF may not contribute significantly to groundwater recharge.

  Establishment of a MUSF would necessitate monitoring wells at the site. Monitoring wells would require authorization from Pima County.

[9] www.azwater.gov/adwr/WaterManagement/Recharge/RechargeCreditsandAccounting

- **Questions remain regarding approval from ADWR for surface water rights purchased by Rosemont.**

  A sever and transfer is necessary from ADWR for the surface water rights at Pantano Dam. In addition, changing from irrigation of the golf course to water release below Pantano Dam for other beneficial uses may require a change in the beneficial use designation. These actions as previously discussed may take several years and result in significant temporal impacts. In addition, this action may be challenged through a protest, so there is no guarantee of approval.

- **250 AFA (17.2% post closure) will not offset the 30-40% of stormwater flow reduction during the active life of the mine.**

  The discharge of 250 AFA at Pantano Dam will not offset the indirect impacts due to the 30-40% diversion of stormwater flows during the 24.5 -30 year life of the active mine. This water will not mitigate the irreversible degradation to aquatic resources occurring during the mine's operation.

**Preservation of Davidson Canyon Parcels**

- **The Davidson Canyon Parcels are not acceptable mitigation under §404 CWA and do not comply with the 2008 Mitigation Rule.**

  Preservation may be used to provide compensatory mitigation when it has been demonstrated that the resources to be preserved provide important physical, chemical, or biological functions for the watershed, contribute significantly to the ecological sustainability of the watershed, are under threat of destruction or adverse modifications; and will be permanently protected through an appropriate real estate or other legal instrument (33 CFR 320.3(h)(1)). The Davidson Canyon Parcels fail to meet these criteria and therefore are not acceptable mitigation pursuant to the 2008 Mitigation Rule.

- **The Davidson Canyon Parcels will be subject to degradation.**

  The Davidson Canyon Parcels would be degraded from surface flow diversion and groundwater drawdown from the mine making them unsuitable as mitigation.

  The Final Environmental Impact Statement (FEIS) predicts a 30-40% reduction in average annual stormwater runoff during the life of the mine. Post-closure stormwater runoff volume is estimated at 17.2% (FEIS Chapter 3 Seeps Springs and Riparian Areas). The reduction in stormwater will degrade the aquatic resources on the Davidson Canyon Parcels making them unsuitable as mitigation.

  In addition to reductions in stormwater flows, these parcels lie within the modeled 5' groundwater contour drawdown, and will be subject to degradation (FEIS Chapter 3, Seeps

Springs and Riparian Areas). The HMMP states it is unlikely these parcels would be affected by a reduction in stormwater flows since the sites support xeroriparian habitat (pp. 9-10). EPA does not agree with this conclusion. The ecological functions associated with streams and associated xeroriparian habitat in Davidson Canyon parcels will be degraded from the proposed mine due to the magnitude of the impacts.

The HMMP proposes preservation credit for aquatic resources and buffer habitat. The calculation of buffer habitat is not provided in the HMMP (p.38). In addition, the HMMP suggests that a modification of the existing grazing regime will enhance riparian and uplands, but a grazing plan has not been developed (p. 53). There is no performance standard criteria proposed for the preservation sites, but modification of future grazing plans could further degrade existing resources as well as other allowable uses such as hunting (p. 63 and p. 68).

- **There is no functional assessment to measure the contribution of these resources to the ecological sustainability of the watershed.**

The HMMP must demonstrate the resources to be preserved provide important physical, chemical, or biological functions for the watershed and contribute significantly to the ecological sustainability of the watershed.

Preservation of the Davidson Canyon Parcels will not provide a net gain in acreage or functional lift. The HMMP does not provide any functional assessment of the parcels. In fact, these parcels represent a potential secondary impact from the project itself and should be assessed and mitigated.

- **There is no demonstration that the Davidson Canyon Parcels are under threat of destruction or adverse modification.**

These parcels are currently surrounded by USFS lands. The HMMP notes these parcels were privately owned and had value for development, yet there is no demonstration they were under any threat of destruction or adverse modification
(33 CFR Part 332.3(h)(1)(h)(iv)).

**The Mitigation Plan does not appropriately address plan requirements described in 33 CFR 332.4(c)(2) through (c)(14) to demonstrate the compensatory mitigation is appropriate for authorized impacts.**

The mitigation plan does not provide adequate information regarding the maintenance plan, performance standards, monitoring requirement, long-term management plan, adaptive management plan and financial assurances as required in the 2008 mitigation rule.

For example, performance standards are missing in several components of the plan. The rule requires that every mitigation plan include objective and verifiable ecological performance standards to assess whether the compensatory mitigation project is achieving its objectives (Preamble 19597, 33 CFR 332.4(c)(9)).

Another example is the failure to provide for adequate monitoring and long term management which is necessary to determine if the mitigation project will meet performance standards and will result in sustainable compensatory mitigation (Preamble p. 19643 -19645, 33 CFR 332.4(c)(10-11)).